

REVIEW

Flora de Nicaragua. Tomo 4. Helechos, the flora edited by W. D. Stevens, O. M. Montiel, and A. Pool, the volume authored by L. D. Gómez and A. L. Arbeláez. Monographs in Systematic Botany 116: 1–348, + i–xvii. 2009. ISBN 0161-1542. Published by the Missouri Botanical Garden, St. Louis. Hard cover. Price: \$109.00. ISBN 978-1-930723-87-0, 151 figures (full page plates), illustrations by A. L. Arbeláez. In Spanish. orders@mbgpress.info; web: <http://mbgpress.info>

This fourth and concluding volume of the Flora of Nicaragua (previous volumes, all seed plants, published in 2001, ISBN 9780915279951) contains coverage of the ferns and so-called “fern allies”, and treats, in alphabetical order, 102 genera and 551 species known from the country. Twelve additional genera and 82 species are also given full treatment, and included in the keys, in expectation that many of these will eventually be found in Nicaragua, since the known distribution is in countries immediately to the north and/or south of Nicaragua. For each species, we are given the accepted name, citation of publication, basionym, salient synonyms, description, habitat, representative specimens (collector and number), range, occasional brief taxonomic discussion, an endangerment code, original line drawings (habit or diagnostic details), and a dot distribution map. Keys to species, but not to families or genera, are included. Introductory sections include a discussion and maps for concentration of both pteridophyte and vascular plant diversity in Nicaragua, and for density of collections within the country (by Stevens), discussion of conservation issues (by Montiel), placement of genera within families, and a general bibliography.

This volume presents an updated and more focused version, for Nicaragua only, of the earlier general flora for the region, *Flora Mesoamericana*, Vol. 1 (Davidse *et al.*, eds., 1995). There are, indeed, many first literature reports of species for Nicaragua, contained within this new work. The authors have generally adopted the most recent classification/taxonomy available for a given genus, with only minor exceptions: filmy ferns are presented in the traditional two genera system, rather than the recently published 9-genus classification by Ebihara *et al.* (2006); and *Cnemidaria* is treated apart from *Cyathea*. I noticed only a few questionable taxonomic decisions, e.g., the Committee for Pteridophyta has declared that the earliest typification of *Acrostichum ebeneum* L., by Tryon, must stand (Taxon 54:831. 2005), the effect being that that name is regarded as a synonym of *Pityrogramma tartarea* (Cav.) Maxon); *Pityrogramma ebenea* (L.) Proctor was used for this species by the authors. *Dryopteris rossii* is included in the flora on the basis of Gómez 6160, but I think it likely that this specimen is either mislocalized or misidentified. *Nephrolepis cordifolia* is said to be naturalized in the Neotropics, but the type, from the Dominican Republic, is conserved (McNeill *et al.*, eds., Vienna Code, 2006), and the species generally considered to be native to at least parts of the New

World. Also, *Nephrolepis multiflora* is listed as a synonym of *N. hirsutula*, even though Hovenkamp and Miyamoto (Blumea 50: 279–322) included the former as a synonym of *N. brownii* (Desv.) Hovenkamp & Miyam., a species also accepted in the present flora; most likely, specimens assigned to *N. hirsutula* by Gómez and Arbeláez are really *N. brownii*, and specimens determined as the former are misidentifications. One somewhat confusing aspect of this flora is that a substantial number of species (e.g., *Psilotum nudum*, *Botrychium schaffneri*, *B. virginianum*, *Ophioglossum crotalophoroides*, *Hymenophyllum pulchellum*, *H. trapezoidale*, *H. undulatum*, and *Asplenium salicifolium*, to name a few) listed by Gómez (1976; Brenesia 8:41–57) in his enumeration of ferns of Nicaragua are included in the present flora on the *expectation* of their possible occurrence in Nicaragua—this, despite the statement by Gómez (1976, p. 41) that the earlier list was compiled from ferns “conocidos hasta la fecha como resultado de una revisión de literatura y el examen de varios miles de ejemplares colectado por mí y depositado en el Herbario Nacional de Costa Rica y mi herbario personal.” One would have preferred an unambiguous statement to the effect that the current authors were now unable to verify the existence of the species in question in Nicaragua. This underscores the inadvisability of accepting range statements for floras on the basis of literature citations. I myself have been guilty of this (Smith, 1981, Flora of Chiapas), accepting, uncritically, range statements for species said to be in Nicaragua by Gómez (1976); in turn, my range statements (for Nicaragua) were taken up in the *Flora Mesoamericana* (Moran & Riba, 1995). In this way, the cycle of misinformation continues.

The largest pteridophyte genera for Nicaragua are *Thelypteris* s.l. (51 spp.), *Asplenium* (39 spp.), *Elaphoglossum* (28 spp.); *Trichomanes* s.l. (28 spp.), *Adiantum* (26 spp.), *Diplazium* (23 spp.), and *Selaginella* (21 spp.). In fact, the 10 largest genera comprise nearly half of the species known from the country. Only two species are considered to be endemic: an unnamed *Anemia* and *Thelypteris mombachensis*. From the distributions maps, one can readily discern the most common (often weedy) ferns in Nicaragua: *Adiantum concinnum*, *Blechnum occidentale*, *Lygodium venustum*, *Microgramma percussa*, *Pityrogramma calomelanos*, *Tectaria heracleifolia* and *T. panamensis*, *Thelypteris dentata* (naturalized) and *T. nicaraguensis*. These, and a few others, are represented by more than 30 collections.

All species are estimated to fall into one of several categories depending on abundance/rarity of collections: in order of greatest endangerment these categories are CR, in critical danger; EN, in danger; VU, vulnerable; NT, somewhat threatened; LC, of lesser concern. Given the intrinsic uncertainties of assessing species vulnerability in any tropical area, approximately 35 spp. are considered as CR (usually only one collection known from the country); 160 spp. are EN (generally 1–2, up to ca. 7, collections known); and 156 spp. are VU (generally 4–10 collections known). By these estimates, more than 60% of the pteridophytes of Nicaragua are vulnerable, if not greatly threatened, a staggering percentage. Even though nearly all species of ferns have wider distributions outside the country, these statistics should cause concern. That

so many Nicaraguan ferns are known from only one or two collections also suggests that there are likely many species not yet collected in the country.

The illustrations are helpful, well executed, and pleasingly arranged by Alba Arbeláez, a co-author of the book. Kudos to her for her artistry, and for citing vouchers for the drawings! Also, the editing process is superb, the book is about as error-free as a flora can be. I enthusiastically recommend this book to anyone wanting to know about, or identify, pteridophytes from Nicaragua.—
ALAN R. SMITH, University Herbarium, University of California, Berkeley, CA 94720-2465.